COINING.

We publish on our previous page a series of engravings illustrating the various processes employed in the manufacture of money, a business which, being mostly in the hands of governments, is not in the category of ordinary manufacturing operations, but which is, nevertheless, a very extensive and important trade. The amount of money annually minted is prodigious; and the necessity for perfect accuracy in weight and fineness of every coin gives the business the peculiar interest attaching to all minute and delicate operations conducted on a very large scale.

The first step is the mixing of the alloy, which in this country consists of 9 parts pure metal to 1 part alloy. The alloy for silver coin is copper; for gold, a mixture of silver and copper, the proportion of silver in the mixture being not more than one half. In practice, but a small portion of the alloy for gold is silver. The silver is readily prepared for coining; but the gold frequently is found to be brittle when cast into ingots, owing to the presence of impurities. Many of these foreign matters are diminished by treating the molten metal with a stream of chlorine gas. When the standard of purity is accurately adjusted, the metal is cast into ingots, long enough in proportion to their thickness to be rolled into strips of the required thickness (see Fig. 1). The ingots are then heated (Fig. 2) and rolled into long strips (Fig. 3). In our Fig. 4 is shown the operation of punching out circular disks from these strips; and this process is one of great nicety, as the disks require to be so nearly correct in weight that the final adjustment can be readily made. In Fig. 5, is shown the weighing room, where any trifling overweight on each disk is removed with the file, care having been previously taken to make the pieces over rather than under the correct weight. Fig. 6 shows the coining presses, in each of which are a die and a counterstnk, engraved with the devices for the obverse and reverse sides of the coin respectively. This operation completes the coin, except as to its edge, which is finished by the machine shown in Fig. 7, which raises the circumferential rim which protects the embossed face of the coin from abrasion by friction in use. This machine rims from 800 to 900 coins per minute; and words or devices can be embossed on the rim, when required, by a straight steel die, against which the coins are pressed with great force, and rotated. Milled edges are made by this machine, the die being properly cut for the purpose.

The coin is now finished, being perfect in value, weight, and form; and all that now remains to be done is to cleanse it from the dirt of the manufacturing processes, and give it the beautiful appearance which characterizes new money. This done by scouring and washing, as shown in Fig. 8; and the money is then put up in packages for storage, as shown in Fig. 9. The waste strips are readily beaten into ingots, as shown in the same engraving; and all filings and dust of the precious metals are carefully saved.

The series of illustrations gives a clear and accurate idea of the system generally in use; but of course the processes are varied in different establishments.

THE BUDDHA CRAB.

Rev. C. W. Everard writes to *Land and Water* that he was, two years ago, in the northeast of China, and was then told that the natives there not unfrequently caught some small crabs which have a most ridiculous face on one side. "They call them the Buddha crabs. I was very anxious to see some; and before I left, the two that I now have the pleasure of sending you, and which I beg you will accept, were brought me. One has, unfortunately, suffered in its long journeys, but the other is nearly perfect. The face is very distinct, and looks like a very jovial old fellow much given to wine."

In reply, the editor, Mr. Frank Buckland, says: "I now give a portrait of this remarkable crab; it is just the size of the top of the thumb; the claws are very small. The nearest approach to it is the masked crab (*corystes Cassivelaunus*), sometimes found in the British seas. One of these was exhibited alive in the aquarium of the Zoological Gardens, in 1860. I think it would puzzle even Mr. Darwin to account for this extraordinary resemblance to the human face on the back of a crab. This crab comes from China, and, strange to say, the markings on his back exactly resembled the face of an ugly old Chinaman. The eyes are closed, but they are oblique to the face, and are surmounted by heavy eyebrows. The nose is rounded and flattened; at each corner there is a warty projection. The moustache is curled exactly like the moustache we see on a Chinaman. The mouth seems ready to open and swallow any quantity of food."

THE BUDDHA CRAB.

Ducks and Terrapins.

Everybody, says the Baltimore *Sun*, has heard of Chesapeake canvas-backed ducks and diamond-backed terrapins, and a great many people know something of how they taste when served up for the table, but not a great many are acquainted with the manner in which they are handled by the dealers in those and other famed gastronomic luxuries. There is an establishment in Baltimore which has been fitted up especially for this trade, where canvas backs and all kinds of game are kept by the thousands in apartments where the temperature remains at 18° above zero, and where terrapins in multitudes live and grow fat on nothing. There are five large closets on the premises, built in the walls, similar to bank vaults, and these, by a scientific process, are arranged to keep their interiors at a very low temperature, by the use of ice, but in a different manner from the freezing process of a refrigerator. In one of these the canvas backs and other wild game are kept perfectly fresh; in another there are all varieties of fish, including shad from Savannah, white fish from the lakes, rock and perch from the Chesapeake tributaries, and blue fish, haddock, and codfish from the North. In another closet the smaller and more common fish are kept, and all of the closets are filled with some of the special products dealt in. For a month past shipments of canvas backs by the barrel have been made to London, Liverpool, and Paris by steamships from New York and Baltimore. The fowls are taken from the cold closets, and, when on board the steamers, are put in ice, and reach their destinations in excellent condition. Oysters in barrels are also sent to Europe, the oysters being packed with seaweed and corn meal. But the most novel feature of the house is the terrapin department. This room is kept warm, and the terrapins luxuriate in airtight chests, each from five to ten bushels capacity. These are packed full of terrapins, which number many hundreds in the aggregate. The most of them are of the Chesapeake diamond back variety, and all are at least seven inches across the under shell, that being the measurement which the terrapin must reach before, in the opinion of the epicure, it is fitted for the table. There are also kept, in some of the chests, hundreds of slider or red fonder terrapins, a fresh water variety, chiefly from the James river. The habits of the terrapin have been made a study by the dealer. He keeps them in his airtight chests, without food, and says they not only exist deprived of air, but grow fat, and if kept in the chests for six months will each weigh four or six ounces more than when put in. If the terrapins are allowed to have liberty or free air, even in the most limited space, they become very poor, as they seem to draw sustenance from themselves, but do not take food. All the terrapins in the chests are enjoying vigorous existence, as proved by their movements when the lids were raised. The terrapins are principally sold to hotel keepers, and to be served up at oxtra junketings, and bring about $24 a dozen. During the terrapin season of 1874, one house in Baltimore sold a thousand dozen.

Contagion in our Schools.

The prevalence and spread of scarlet fever and diphtheria among the children of this city are facts which should awaken an anxious concern of the profession. It is unnecessary to say that the occurrence of these cases is explained by the fact of direct contagion. No matter what particular views may be advanced in regard to the *modus operandi* of the poison, we hardly believe there are any, at all acquainted with the diseases in question, who would be willing to say that they are not communicable, and hence not amenable to ordinary preventive measnres. But, notwithstanding this belief, a belief shared in by the most intelligent portions of the lay community, we have these diseases cropping out in the schools day by day, under the very eyes of the teachers, and without any apparent effort on their part to arrest the spread. When a child carries a contagious disease from his school to his home, there is always trouble and anxiety in the train, and not unfrequently death, besides the danger of the propagation to other members of the family and among the neighboring children. In the absence of sanitary inspection in our schools, it may seem hardly fair that we urge upon any extra duty to supply the deficiency; but we are convinced that, with very little trouble on their part, a great deal of good can be accomplished. And after all, in this particular the teacher is the fittest person to act, being always in direct communication with every scholar, and being the first to be informed of any illness. It would seem to be a very simple task to send the ailing child home, and at the same time to assume, especially during epidemics, that the sickness may be of a contagious character. Neglect of such precautions causes the sacrifice of many valuable lives yearly; and so long as teachers consider that they have no moral obligations in the matter, we can hardly hope for any change.

Even in the most contagious diseases the danger of infection during the initistory symptoms is comparativoly slight. This certainly is the strongest possible argumcnt in favor of the prompt quarantining of a suspicious case. But while we allow that, with the right disposition on the part of those who have charge of the children, much disease may be prevented, there is another element in the question, and one which it is more difficult to meet, because in a measure beyond the control of the teacher: and that is the premature appearance at school of those who have been the subjects of these infantile diseases. It is well known that the power of propagation lingers in many of these disorders long after convalescence has commenced; and as such a fact is one of the difficult things for ignorant parents to appreciate, there is no wonder that, many times, the most dangerous poisons are sown broadcast.—*Medical Record.*

TO CLEAN colored leather, use 1 oz. oxalic acid dissolved in 1 pint distilled water.

Seal Flesh.

Dr. A. Horner, surgeon to the Pandora, speaking of the Greenland Esquimaux, says: "From the length of time these people have inhabited this cold country, one naturally expects them to have found some particular food, well adapted by its nutritious and heat-giving properties, to supply all the wants of such a rigorous climate; and such is found to be case, for there is no food more delicious to the taste of the Esquimaux than the flesh of the seal, and especially that of the common seal (*phoca vitulina*). But it is not only the human inhabitants who find it has such excellent qualities, but all the larger carnivora that are able to prey on seals. Seal's meat is so unlike the flesh to which we Europeans are accustomed that it is not surprising that we should have some difficulty at first in making up our minds to taste it; but when once that difficulty is overcome, everyone praises its flavor, tenderness, digestibility, juiciness, and its decidedly warming after effects. Its color is almost black, from the large amount of venous blood it contains, except in very young seals, and is, therefore, very singular-looking, and not inviting, while its flavor is unlike anything else, and cannot be described except by saying "delicious!" To suit European palates, there are certain precautions to be taken before it is cookod. It has to be cut in thin slices, carefully removing any fat or blubber, and then soaked in salt water for from 12 to 24 hours to remove the blood, which gives it a slightly fisby flavor. The blubber has such a strong taste that it requires an arctic winter's appetite to find out how good it is. That of the bearded seal (*phoca barbata*) is most relished by epicures. The daintiest morsel of a seal is the liver, which requires no soaking, but may be eaton as soon as the animal is killed. The heart is good eating, while the sweetbread and kidneys are not to be despised.

The usual mode of cooking seals' meat is to stew it with a few pieces of fat bacon, when an excellent rich gravy is formed, or it may be fried with a few pieces of pork.

The Esquimaux make use of every part of the seal, and, it is said, make an excellent soup by putting its blood and any odd scraps of meat inside the stomach, heating the contents, and then devouring tripe, blood, and all with the greatest relish. For my own part I would sooner eat seal's meat than mutton or beef, and I am not singular in my liking for it, as several of the officers on board the Pandora shared the same opinion as myself. I can confidently recommend it as a dish to be tried on a cold winter's day to those who are tired of the everlasting beef and mutton, and are desirons of a change of diet.

Bath Bricks.

The annual importation of Bath bricks into the United States is estimated at 10,000 boxes, there being 24 bricks in each box. These bricks are manufactured from the deposits of the river Parrett, Bridgwater, England, where millions are made annually. Nowhere else are these deposits found, so that Bridgwater supplies the world, and Bath brick are as well known in America, China, and India as in England.

Artists' Brushes.

In a detailed description of the business of a large manufactory of artists' materials, in this city, a *Tribune* reporter gives the following interesting information in regard to the various sorts of hair used in brushes. The principal kinds employed are: Hog's bristles, which, being coarse and stiff, make good varnishing brnshes; bear's fur, which is also stiff and hard, and used mainly for varnishing brushes; badger hair, which is long, soft, and elastic, and of which are made graining and gilding brushes; sable tail hair, which is very long and very elastic, and is made up into the finest and costliest of artists' brushes; camel's hair, also long and elastic, and second only to sable in fineness; and ox hair, which is pulled from the inside of cow's ears, and, being exceedingly long and elastic, makes good striping and lettering brushes. The skins of the animals mentioned are imported in bales, and boys with shears cnt off the hair in handfnls, which are afterwards arranged by the brush makers. The denuded hides are then sold to glue makers. The value of some of the most costly kinds of hair exceeds that of equal weights of gold, so that each particular hair may be said to have its price, and great care is taken to prevent its loss. A double handful of sable tail hair, for instance, is worth $100, and camel's hair is only a little less valuable. The variety of brushes mado is almost infinite, and artists sometimes order them mado after some particular pattern or device of their own. More than a hundred different sizes and shapes are kept in stock, the finest consisting of a few long, delicate hairs, capable of making a mark as fine as the scratch of a needlo point.

The Centennial Exposition.

A correspondent writes to point out that many persons will decline to exhibit at the Centennial because the Commissioners have made no arrangement to receive exhibits by railway and to place them in the proper situations in the department to which they belong. For an exhibitor to go there to put his goods on show, and again, 4 or 5 months afterwards, when the judges are making their awards, will be expensive if he live some distance from Philadelphia. He suggests that the Commissioners should appoint properly qualified men to undertake the removal of exhibits from the railroad depots to the buildings, and to put them in place for exhibition; and he states that exhibitors living at a distance from Philadelphia would gladly pay the expense of such an arrangement.

Bonny, which is now the greatest palm oil market on the West Coast, the manila a bronze coin from Birmingham, England, not unlike a bracelet in shape and size, is the current medium for money; in Old Calabar, the currency is copper wire and brass rods, about three feet in length and bent double; on the Guinea coast, gold dust is used, and one tribe uses strips of iron tied up in bundles of eight or ten pieces.

The fruit from which the oil is obtained grows in the form of a large cone, about the size of a man's hat. It is covered with long spines which protect the nuts, the latter being about the size of a large olive and of a deep golden color. The palm tree forests, in the midst of which most of the factories exist, are said to be very picturesque. The trees, which tower to an enormous hight, are as thick as it is possible for them to be, forming in some places large and impassable clumps, and in others opening in wide and tortuous vistas. The trunks are often covered at the lower part with tufts of lovely fern, the emerald green of whose long fronds, as they droop gracefully to the earth, forms a beautiful contrast to the somber brown of the trunks which they ornament. In the open spots in the forests, the factories, mere collections of huts, are built. In Dahomey, the nuts, when gathered, are thrown into a trough formed by marking off a small area about six feet square, beating down the earth to form a floor and enclosing it in a wall about 18 inches high. Into this receptacle the husks are thrown, to be trodden under foot by women until the husks and the oil which exudes together form a kind of putty. The mass is then thrown into vessels of hot water, when the oil rises to the top and is skimmed off. In Fernando Po, it is the practice to let the nuts rest in heaps until almost putrefied; hammering with stones follows, and then simmering of the pulp in a kettle, after which the women squeeze out the oil with their hands. The men do not engage in the manufacture, their labor ending with the climbing of the trees and shaking down of the fruit. It will be observed that the outside of the nut only enters into the process. The kernel separately yields a so-called black oil, and forms the staple of a trade with England, where the hard portion is subjected to the action of powerful crushing machines.

Oil from the palm nut, is, however, by no means the only fatty product to be obtained from rank African vegetation. No one has ever estimated the vast resources of this description, which abound in the countries bordering on the river Niger; and it is only in the shape of experimental and comparatively small exports that we get a glimpse of them. From Senegambia and Guinea come Touloncuma oil, used by the natives for anointing their bodies, and for burning in lamps, and Galam oil, a natural vegetable butter very much used in Africa for preparing food. The castor oil plant grows wild with great luxuriance in Senegambia; and throughout West Africa there is an immense yield of pea or ground nuts, which already has given rise to a large commerce. In the northern part of the continent and especially Algeria, there are enough olive trees to supply, if fully developed, the demand of all Europe. The province of Kabyle is one enormous olive tree forest. The cocoanut palm grows in immense forests in Zanzibar, where its fruit is exported to France and England, for making stearine for candles. The *trichilia capitata* on the Zambesi produces small black seeds which contain a large quantity of solid fat. The "forna" nut of Central Africa yields an excellent oil for culinary purposes, and is cultivated by the natives. A tree discovered by Dr. Kirk on Lake Nyassa also gives a rich oil, which even the natives have not utilized.

There is no doubt but that, in the gradual progression of commercial colonies for the development of the resources we have indicated, the most rapid means for opening up the interior of Africa, will be found. Such expeditions as those of Stanley and of other isolated explorers, though they may add to our knowledge of other resources, do nothing toward their utilization, but rather only show us how great is the task which civilization sooner or latter must accomplish, in overcoming the natural obstacles of a neglected continent.

ANOTHER NEGLECTED INDUSTRY---MUSHROOM RAISING.

We have never been able to understand why mushrooms are such an expensive delicacy in this country. Every variety of the toothsome fungus—even the Italian mushroom, the most delicious of all—grows wild in our pastures or can be raised in our climate with very little care. And yet, those who most use mushrooms, the hotel and restaurant proprietors, buy the French canned goods, save for a short time in the autumn when a small supply of fresh mushrooms are obtainable. French mushrooms cost all the way from 50 cents to $1 for a little can, at retail; and to buy a small basket of fresh mushrooms, even in our large markets, is rather to overtax the average pocket. Still we have picked them by the pailful in Connecticut cow and horse pastures; but the natives looked askance at our eating them; and as to cultivating the "toadstools," the idea to their mind was preposterous.

Now, with all due deference to our excellent farmers who think as above, we venture to affirm that, if a few of them would set about this cultivation on a large scale, and offer the products in the cities, they would find a ready sale, and realize quite a large profit. Occasionally a florist makes a mushroom bed in his greenhouse, and lovers of the delicacy sometimes cultivate it in a small way in their conservatories and cellars; but with the exception of the effort made by the late Professor Blot, that prince of French cooks, who came to this country as a missionary to reform us from dyspepsia-breeding pie and fried meat, we know of no attempt being made here at their cultivation on a commercial scale. The professor built wooden structures under ground, and they decayed; then he grew tired of his project and let it die through neglect, before any of its results, good or bad, could be seen. Near Paris, Blot had seen immense cases, from 20 to 60 feet in depth, filled with mushroom beds, the length of all of which beds together in one year aggregated over 21 miles; and he knew well that often a single building stone quarry, in the excavations of which the beds were located, sent 3,000 pounds of mushrooms daily into the French metropolis. No wonder, then, seeing the utter absence of the fungus from our markets, that he perceived an opening for a lucrative business in its cultivation.

The reader who may wish to try mushroom culture in a small way—which he had best do as a beginning—will find his cellar, if he dwells in the city, or any convenient outhouse, if in the country, a suitable place for a few beds. The material required is horse manure, which must be sweated by gentle and careful fermentation for a week or a fortnight, until most of the rank straw and grass is decomposed. Turn over the mass every two days, and by the end of about a fortnight it will be partially fermented, no longer offensive to smell, and in fact sweet enough to be placed in the cellar of a dwelling. An average depth of a foot or eighteen inches makes a good bed, which should be about a yard wide, with its contents well packed. The shape is immaterial. It is useless for the cultivator to prepare his own spawn, as it can be purchased very cheaply from nurserymen, at from 15 cents to 25 cents a pound. The quality, however, is important. Good spawn can be told by the minute white threads which permeate it in all directions, and these should not be too far developed. A reliable dealer will have the right kind. The spawn is first broken into bits about 1½ inches or so in cubic contents, care being taken that each piece has the white threads running through it. These fragments are planted in the manure at a depth of 3 inches, and placed about 4 inches apart. Then the bed is firmly rammed down with a spade or mallet, and about ten inches of good loam packed hard and smooth on top, the surface lastly being covered with hay or straw. Care should be taken that the cellar or outhouse selected is sufficiently sheltered, so that a constant temperature of from 55° to 60° Fah. is maintained in it. The mushrooms will appear in about six weeks, and the beds will bear for from one to three months, according to the quality of spawn, strength of manure, etc. Water only about once a fortnight and then sparingly; the temperature of the water should not be below 60° Fah.

In plucking the mushrooms pull out the stalk, as, if left, it is liable to decompose and injure succeeding crops. Instead of beds as described, the manure can be packed in boxes or tubs to within 2 or 3 inches of the surface, and loam added above. The difficulty with box culture is, however, that the heat does not remain constant, though this may be compensated for by plunging the boxes up to the rims in decomposing manure during the preliminary stages of the growth within. Mushrooms have been grown well on a warm shelf in a kitchen, and excellent crops have been obtained from beds made on shelves in a stable where the heat of the animals supplied the needed warmth. In summer it is only necessary to make a bed in the coolest and shadiest portion of the garden; this should be covered, to keep it moist and to protect it from the ravages of rats, mice, and snails, all of which will greedily eat the young fungus.

There are some valuable treatises on mushroom culture extant, from which those who contemplate extended cultivation can obtain full instructions. The cultivation, however, is so simple that very little skill is required to conduct it.

Some years ago, the Royal Horticultural Society, in England, made strenuous efforts to popularize the mushroom, and offered prizes for collections of fungi, and gave numbers of excursions and dinners in which the mushroom was substituted for meat. But little success attended these efforts, mainly on account of the difficulty found in distinguishing the genuine and safe mushroom from the dangerous and poisonous fungi, and also on account of a popular prejudice which looks upon any fungus as a mere sign of noisome decay. Of course when raised from reliable spawn, danger from eating the mushrooms is not to be apprehended; but it is unsafe to collect from pastures fungi for edible purposes unless one is familiar with the subject.

CAN WE PROTECT OUR BANK VAULTS?

Seven armed men recently entered the house of the cashier of the Northampton National Bank, at Northampton, Mass., and compelled that officer at the muzzle of the pistol to reveal the combination of his safe vault. Then they bound and gagged him and his entire family of seven persons, quietly waited until the bank's night watchman had departed, opened the vault and safe, and stole $750,000 in cash and securities. The annals of crime can show few more audacious robberies than this, nor do we know of one which has excited a wider spread feeling of insecurity or a more general distrust of all modern burglar-proof devices. Certain it is that no lock, however intricate, is safe so long as the means of opening it is in the hands of any one person; for no man, however brave, can withstand the persuasions of a night attack on his family and of a cold pistol barrel pressed against his temples in order to make him hand over his keys or divulge the information demanded. It may well be asked if seven men can plan and successfully carry out such a scheme, whether twice seven men could not perpetrate even a more gigantic robbery; and when we consider the matter in the light of the elaborate precautions taken by the thieves and their intimate knowledge, which they spend weeks in acquiring, of a marked point of attack (all detailed recently by a convict captured in a similar undertaking), it is but natural at first to doubt the safety of any bank or strong box. But on the other hand, it is reasonably certain that, if the Northampton bank people had been as vigilant as the thieves, the robbery could not have occurred; and it seems to us that, if the means which Science offers for protecting our valuables were fully used, such robberies would be impossible, or at the least be very difficult, of perpetration. Suppose, for instance, a chronometer lock had been in action on the Northamption safe. Then what would have availed the binding and gagging of the family of the unfortunate cashier, and an assault on his person, since he would have been as powerless as the thieves to enter the stronghold? At a certain time next day, when all the employees of the bank would be at their desks, the safe could be opened; until then, if properly made, nobody could stir its doors. Rendering it the duty of two bank officers, one as a check on the other, to assure themselves that that lock was in working order at the last thing before closing the bank for the night, would prevent any tampering with the mechanism; and should the lock be inoperative, the very circumstance would instantly suggest extra vigilance during the night and until the difficulty could be remedied.

Another safeguard is found in never trusting the means of opening the safe to a single individual, a plan frequently adopted in banking institutions in cities. There might be, for instance, three locks to a door; and the key or the combination which throws back each could be in the possession of a different officer, so that no one of the trio could enter alone. This would necessitate the robbers intimidating three persons instead of one. Or the knowledge of a combination might be kept a secret, by the president, for example, and the cashier possess only a key to be used in connection with the combination.

There is much safety to be found in properly constructed electric devices. Why, for example, has not somebody invented a thief catcher—a couple of metal knobs which must necessarily be turned in attempting to open a door? At night, lead a powerful interrupted battery current to those knobs. When the burglar grabs them they will grab him, for he cannot let go, as every one knows who has tried to release the handles of the simple magneto-electric machines from which itinerant scientists at country fairs offer to administer shocks for a penny or two each. The burglar, besides, will get so thorough a shaking that he would convert himself into an alarm, and yell loud enough to awaken any somnolent neighborhood. Electric wires might be laid from every door in the bank to convey an alarm, say to a police station or any other desired point; and if those wires were so placed that cutting them in advance could quickly be told through the breakage of the circuit, tampering with them could be found out in time and proper precautions taken.

It has been suggested that the next advance of the thieves will be a day attack on a bank, through the use of an exploding shell tossed in among the clerks, and a rush for the funds in the confusion. For this, the only remedy appears to be constant watchfulness, or the encasing of the people handling money in a separate armored room, and not dividing them by a mere wood and glass partition from the crowds which often congregate outside the tellers' windows. We have some banks in our mind whose counting rooms are very poorly suited to withstand an attack of the above kind.

We think that there is abundant ingenuity in this country to provide means of frustrating the smartest and most audacious of burglars; and that if inventors will set about it, devices much more efficacious even than those which have occurred to us can be produced. At any rate it is hardly time to suggest the abolition of banks, as does a daily contemporary of this city, and thus admit that we are outwitted by rascals, until we have seen what the inventors can do, and certainly not before we have fairly tried the safeguards with which we are already provided.

REMARKABLE PUMPING ENGINES.

We publish in this week's SCIENTIFIC AMERICAN SUPPLEMENT (No. 9) two pages of engravings illustrative of the remarkable steam pumping machinery, lately completed at Hammersmith, England, by Messrs. Gwynne, for the drainage of the Ferrara Marshes, Northern Italy.

The tract to be drained covers an area of 200 miles. The machinery we allude to is calculated to discharge 456,000 gallons of water per minute, or 656,640,000 gallons per day; being about six times the capacity of the Croton Aqueduct of this city, which is able to deliver 110,000,000 of gallons per day. The water delivered by these remarkable pumps forms a stream 103 feet wide and 4 feet deep, having a speed of two miles an hour; one day's delivery would fill a reservoir one mile square to a depth of 3 feet 9 inches. In view of the completion and successful operation of gigantic and economical machinery like this, the drainage of the Zuyder Zee, in Holland, which is about to be commenced, is rendered a comparatively easy task. The Zuyder Zee area to be drained is 759 square miles. Splendid models of the abovementioned machinery are to be exhibited in the British department of the Centennial Exhibition.

Improved Lantern Galvanometer.

In the arrangement recommended by Professor Nipher, an astatic system of needles is used, supported by silk fiber. The distance between these is four inches, and the system is placed over the lens of a vertical lantern. The image of the lower needle is thrown upon the screen. The upper one is out of focus and is invisible. The needles are deflected by two coils situated on each side of the upper needle, and out of the field of view. The distance between the coils is varied to any desired extent to adapt the instrument to the different currents. The connections are such that the instrument can be instantly used in measuring electrical resistances. The resistance can be diminished in working with the thermo-currents, or increased with ordinary galvanic currents.